

# NASA SBIR/STTR Technologies

A1.03-9714 - High Resolution Autostereoscopic Cockpit Display



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## Identification and Significance of Innovation

Interest in 3D displays for the cockpit dates back to US Air Force studies conducted at Wright Patterson Air Force Base (WPAFB) in the late 1980s and 1990s, indicating that 3D increased situation awareness, safety and awareness of threats. Recently, interest in 3D image display has surfaced among DAD Technologies customers who use helicopters and make camera systems for helicopters, for purposes of hazard avoidance and improved power line inspection capabilities. In the past, adaptation of 3D displays in the cockpit has been thwarted by degraded resolution, artifacts, and viewing position restrictions associated with glasses-free displays. DTI has developed a new glasses-free 3D technology that eliminates these drawbacks. However the technology must be adapted to cockpit use through compact design, and adaptation/interfaces to the aircraft computer system, electronics, and mechanicals, and modifying software to work with this new type of display.

Estimated TRL at beginning and end of contract: ( Begin: 3 End: 3 )

## Technical Objectives and Work Plan

DTI's current displays are designed for indoor office applications, and thus requirements for brightness and environmental conditions are not especially stringent. Much of the Phase I effort will be dedicated to determining how best to adapt the technology to meet the strict requirements associated with cockpit displays. The ultimate goal of this program will be a Phase II prototype that can be tested first in a simulator and then ultimately in a cockpit. A major goal in terms of adaptation of 3D to the cockpit will be fitting DTI's technology, plus related electronics, into the volume envelope allowed for existing displays. This effort will be in line with efforts to reduce the thickness of our lighting systems for commercial applications, eventually allowing production of 3D displays that are as thin as conventional 2d displays. Another goal is the definition of software, and possibly electronics, to the display of real time computer generated images in 3D. Another major goal will be an investigation of the adaptation of aircraft and rotorcraft hazard avoidance and inspection camera systems to 3D displays.



## NASA Applications

Displays embodying the proposed technology would have wide application for improved situation awareness aboard aircraft and spacecraft, as well as air or space based telerobotic applications such as manipulator arm operation on the International Space Station. DTI 3D displays would also be of benefit to NASA laboratories for engineering, scientific visualization, and training.

## Non-NASA Applications

The bright, rugged 2D/3D switchable displays developed under this program will have application in civilian and military aircraft and rotorcraft for situation awareness and hazard avoidance as well as a variety of military ground and ship based applications. Commercial versions of the displays could find wide application in engineering, scientific visualization, medicine, and consumer electronics.

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**NON-PROPRIETARY DATA**